Barmak Sani, Reg. No. 45,068, (650) 326-2400
Attorney Docket No.: 20185-000110US

Title: Method for Measurement of Pitch in Metrology

Applicant: Farid Askary

Sheet \_\_\_\_\_\_ of 5

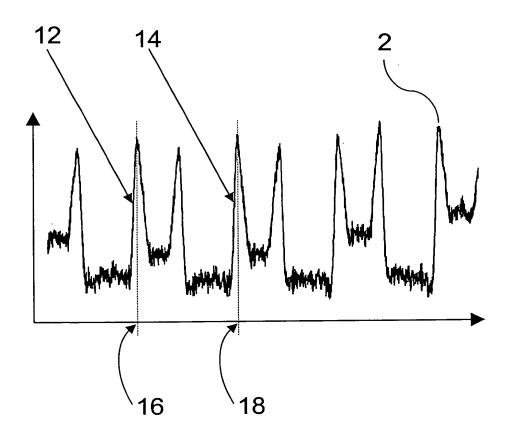


FIG. 1 (Prior Art)



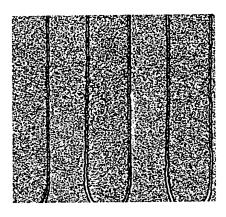


FIG. 2(a) (Prior Art)

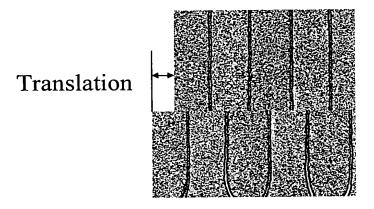


FIG. 2(b) (Prior Art)

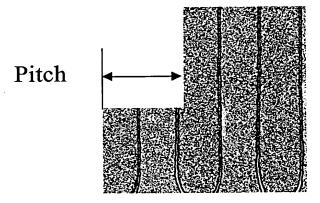


FIG. 2(c) (Prior Art)

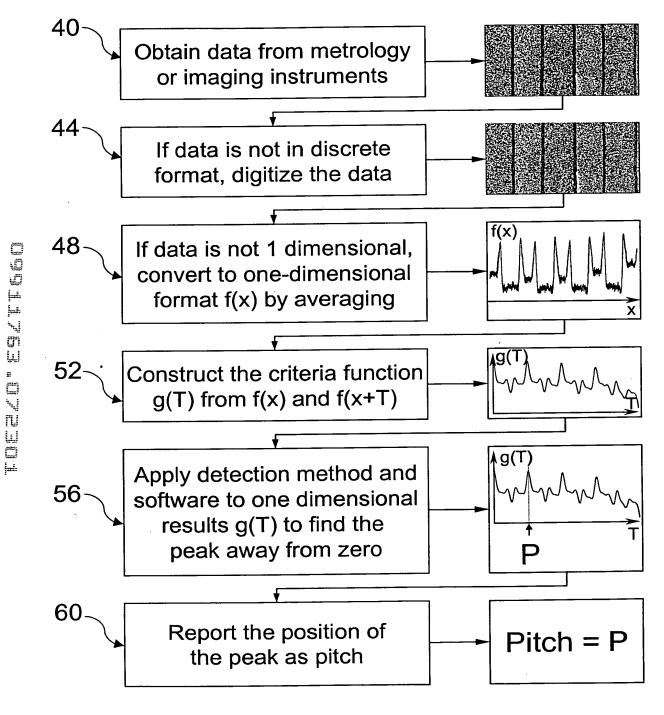


FIG. 3

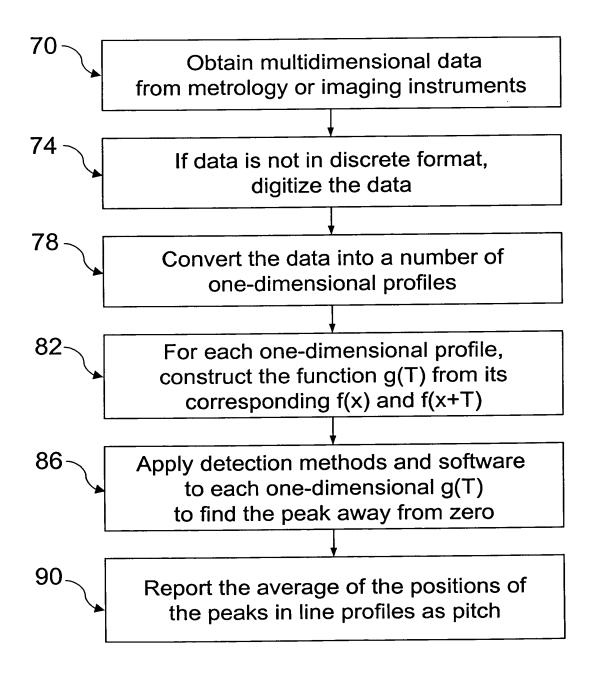


FIG. 4

## Performance Comparison - Pitch Measurement Precision Present Method versus Existing Algorithm

Pitch Measurement (nm)

	Existing Algorithm, Commercially Available Scanning Electron Microsocpe									
	Meas. # 1	Meas. # 2	Meas.#3	Meas. #4	Meas. #5	Meas. #6	Meas. # 7	Meas. #8		
Site 1, Cycle 1	699.1	701.2	699.9	700.2	700.0	700.1	699.3	698.5		
Site 2, Cycle 1	701.2	699.7	700.7	701.6	702.1	701.7	701.3	700.3		
Site 3, Cycle 1	704.3	703.2	703.0	703.5	702.6	702.7	703.6	701.8		
Site 4, Cycle 1	696.9	695.1	695.5	695.2	696.2	695.0	694.7	695.3		
Site 5, Cycle 1	699.7	698.2	699.0	698.8	699.2	700.2	698.6	701.0		
Site 6, Cycle 1	699.7	699.0	701.9	699.5	699.1	701.1	699.3	699.7		
Site 7, Cycle 1	695.5	696.2	694.9	696.0	695.7	695.1	695.8	695.8		
Site 8, Cycle 1	703.6	704.3	704.9	704.2	704.5	702.9	703.2	703.6		
Site 1, Cycle 2	698.4	697.9	698.4	697.5	698.2	698.3	698.9	698.1		
Site 2, Cycle 2	696.9	696.8	696.3	697.3	696.4	697.4	697.1	697.8		
Site 3, Cycle 2	700.2	698.7	699.2	699.0	699.3	699.0	699.1	699.5		
Site 4, Cycle 2	697.6	697.4	697.8	697.8	697.2	697.6	697.3	697.7		
Site 5, Cycle 2	693.6	694.1	693.0	693.3	694.0	693.5	693.6	693.4		
Site 6, Cycle 2	699.4	700.8	701.4	699.3	700.2	699.9	700.3	700.1		
Site 7, Cycle 2	700.1	700.8	700.5	699.9	699.4	700.3	699.0	699.7		
Site 8, Cycle 2	697.7	696.7	697.4	697.8	697.9	697.3	697.4	698.1		

Average: 698.8 Total Variance: 7.35

Total Pitch Measurement Precision - Three Standard deviaitons (nm): 8.13

Pitch Measurement (nm)

Present Method - Calculated from the identical experimental scan profiles as in above

Meas. #1	Meas. # 2	Meas. # 3	Meas. # 4	Meas. # 5	Meas. # 6	meas. # /	meas. # o
700.48	700.35	700.37	700.36	700.34	700.23	700.28	700.26
699.86	700.07	699.61	699.82	699.83	700.10	700.03	700.05
699.76	699.63	699.60	699.50	699.43	699.45	699.51	699.33
700.01	700.07	699.73	699.95	699.88	699.82	699.82	699.73
699.03	699.29	699.06	699.13	699.12	699.01	699.01	699.20
701.22	701.28	701.41	701.12	701.28	701.35	701.34	701.45
698.97	698.88	698.66	698.91	698.79	699.00	698.67	698.58
700.02	700.00	699.69	699.66	699.65	699.60	699.23	699.45
698.35	698.18	698.49	698.32	698.22	698.53	698.64	698.60
699.84	699.61	699.49	699.61	699.37	699.68	699.69	699.80
699.49	699.42	699.38	699.39	699.38	699.40	699.19	699.24
699.56	699.98	699.81	699.99	699.71	699.92	700.03	699.56
699.51	699.29	699.45	699.25	699.23	699.36	699.22	
700.30	700.29	700.25	700.19	700.22	699.89	700.16	
701.71	701.57	701.75	701.67	701.73	701.53		701.33
699.98	699.68	699.79	699.57	699.76	699.60	699.49	699.42
	700.48 699.86 699.76 700.01 699.03 701.22 698.97 700.02 698.35 699.84 699.49 699.56 699.51 700.30 701.71	700.48 700.35 699.86 700.07 699.76 699.63 700.01 700.07 699.03 699.29 701.22 701.28 698.97 698.88 700.02 700.00 698.35 698.18 699.84 699.61 699.49 699.42 699.56 699.98 699.51 699.29 700.30 700.29 701.71 701.57	700.48 700.35 700.37 699.86 700.07 699.61 699.76 699.63 699.60 700.01 700.07 699.73 699.03 699.29 699.06 701.22 701.28 701.41 698.97 698.88 698.66 700.02 700.00 699.69 698.35 698.18 698.49 699.84 699.61 699.49 699.49 699.42 699.38 699.56 699.98 699.81 699.51 699.29 699.45 700.30 700.29 700.25 701.71 701.57 701.75	700.48         700.35         700.37         700.36           699.86         700.07         699.61         699.82           699.76         699.63         699.60         699.50           700.01         700.07         699.73         699.95           699.03         699.29         699.06         699.13           701.22         701.28         701.41         701.12           698.97         698.88         698.66         698.91           700.02         700.00         699.69         699.66           698.35         698.18         698.49         698.32           699.84         699.61         699.49         699.61           699.49         699.42         699.38         699.39           699.56         699.98         699.81         699.99           699.51         699.29         699.45         699.25           700.30         700.29         700.25         700.19           701.71         701.57         701.75         701.67	700.48         700.35         700.37         700.36         700.34           699.86         700.07         699.61         699.82         699.83           699.76         699.63         699.60         699.50         699.43           700.01         700.07         699.73         699.95         699.88           699.03         699.29         699.06         699.13         699.12           701.22         701.28         701.41         701.12         701.28           698.97         698.88         698.66         698.91         698.79           700.02         700.00         699.69         699.66         699.65           698.35         698.18         698.49         698.32         698.22           699.84         699.61         699.49         699.61         699.37           699.49         699.42         699.38         699.39         699.38           699.56         699.98         699.81         699.99         699.71           699.51         699.29         699.45         699.25         699.23           700.30         700.29         700.25         700.19         700.22           701.71         701.57         701.75         701.6	700.48         700.35         700.37         700.36         700.34         700.23           699.86         700.07         699.61         699.82         699.83         700.10           699.76         699.63         699.60         699.50         699.43         699.45           700.01         700.07         699.73         699.95         699.88         699.82           699.03         699.29         699.06         699.13         699.12         699.01           701.22         701.28         701.41         701.12         701.28         701.35           698.97         698.88         698.66         698.91         698.79         699.00           700.02         700.00         699.69         699.66         699.65         699.60           698.35         698.18         698.49         698.32         698.22         698.53           699.84         699.61         699.49         699.61         699.37         699.68           699.49         699.42         699.38         699.39         699.38         699.39           699.56         699.98         699.81         699.99         699.71         699.92           699.51         699.29         699.45	700.48         700.35         700.37         700.36         700.34         700.23         700.28           699.86         700.07         699.61         699.82         699.83         700.10         700.03           699.76         699.63         699.60         699.50         699.43         699.45         699.51           700.01         700.07         699.73         699.95         699.88         699.82         699.82           699.03         699.29         699.06         699.13         699.12         699.01         699.01           701.22         701.28         701.41         701.12         701.28         701.35         701.34           698.97         698.88         698.66         698.91         698.79         699.00         698.67           700.02         700.00         699.69         699.66         699.65         699.00         698.64           699.84         698.18         698.49         698.32         698.22         698.53         698.64           699.49         699.41         699.49         699.37         699.68         699.69           699.49         699.42         699.38         699.39         699.71         699.92         700.03

Average: 699.8 Total Variance: 0.64

Total Pitch Measurement Precision - Three Standard deviaitons (nm): 2.40